

## The Effect of Music Therapy on Sleep Quality among Children With Chronic Disease

Resi Putri Naulia<sup>1\*</sup>; Allenidekania<sup>2</sup>; Happy Hayati<sup>3</sup>

1. Lecturer of Nursing Study Program, Politeknik Karya Husada, Jakarta, Indonesia

2. Lecturer of Pediatric Nursing Department, Faculty of Nursing, Universitas Indonesia

3. Lecturer of Pediatric Nursing Department, Faculty of Nursing, Universitas Indonesia

\* Corresponding: resipn15@gmail.com

### ABSTRACT

The priority of handling children with chronic illness is to improve the quality of life by paying attention to the symptoms that arise during treatment, one of which is the sleep problem. The study aimed to examine the effect of music therapy for the sleep quality of children with chronic disease. A quasi-experimental study design used in this study with 30 samples was divided into experimental group and control group. Respondents were given music therapy in 30-45 minutes before bed for four days. Sleep quality is measured by using the Pittsburgh Sleep Quality Index (PSQI). The results showed that music therapy was significant on sleep quality after receiving the program compared with the control group ( $p=0,001$ ). Thus music therapy could be used as an alternative intervention to improve the sleep quality to enhance the quality of life of children with chronic disease.

**Keywords:** children, chronic disease, music therapy, sleep quality

### 1. Introduction

Chronic disease is a condition of long duration or one that progresses slowly, shows little change and often interferes with daily functioning (1). Chronic illness may affect a child's physical, psychosocial, and cognitive development (1). In most cases, these chronic conditions become lifelong disorders. However, the impact on the affected child is variable according to the severity of the situation, the stage of growth and development when the condition occurs and the child's and family's responses to the disease. Although some circumstances require intense monitoring and technological support for survival, other states cause few limitations and minimal effects on quality of life (2). One condition that affects the quality of life of children with chronic diseases is sleep.

Children with chronic disease often reported sleep disorders. Forty percent of children and adolescents said difficulty sleeping before a cycle of myelosuppressive chemotherapy, and reports of difficulty sleeping didn't change significantly at one and two weeks following receipt of chemotherapy (3). Children with chronic kidney disease experienced sleep disturbances. The prevalence of any sleep disorder of children with ranged from 77 to 85 % in dialysis patients to 32–50 % in transplanted patients and 40–50

% in non-dialysis patients. The most commonly studied disorder was restless legs syndrome, which presented at a prevalence of 10–35 % (4). Based on an interview with a head nurse in the non-infection room of RSUPN DR. Cipto Mangunkusumo, sleep problem is among the most frequently named symptoms and is reported by children and adolescents but often not realized by children, parents, and health workers.

Sleep complaints that often appears are restless sleep, excessive daytime sleepiness, obstructive sleep apnea, insomnia and fatigue (5). Fatigue and sleep problem are a stressor for cancer in adolescent's, the effects of chemotherapy which impact the quality of life (6). Poor sleep has a negative impact on the quality of life (5). Therefore, maintaining a regular sleep pattern in stressful situations, such as chronic illness is very important to improve the long-term quality of life of children.

Realizing that both physiological and psychological factors influence sleep, non-pharmacological methods that promote interaction between mind and body such as music therapy are used as an alternative to overcome sleep problems (7,8). Previous studies had shown that music was an effective intervention in reducing sleep problems and could improve sleep quality in patients with acute and chronic sleep disorders (9, 10). The other study in patients with percutaneous transluminal coronary angiography showed that groups using earplugs, eye protection and listening to music reported a significantly higher quantity and quality of sleep than those who used earplugs and glasses but without listening to music (11). The other study on adult patients with chronic kidney failure at H. Adam Malik General Hospital, Medan showed that music therapy could increase sleep quality (12). Listening music can reduce plasma cortisol (13) and relaxation (14). Soothing music can improve sleep quality by extending sleep duration. This effect provides an alternative and non-invasive way to improve the sleep of people experiencing sleep problems (15) and is a safe, inexpensive and easy method for treating sleep problems (10).

## **2. Objectives**

The study aimed to examine the effect of music therapy on sleep quality of children with chronic disease.

## **3. Methods**

This study used a quasi-experiment. The sample size was 30 children with chronic diseases; aged 8-18 years, experience sleep disorders (PSQI  $\geq 5$ ). Thirty respondents were divided into experimental group who were given music therapy and control group without music therapy. The research instrument was the Pittsburg Sleep Quality Index (PSQI) instrument (16). PSQI has seven indicators measuring subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. The total score ranged from 0-21 with higher scores indicating poorer sleep quality. A PSQI score  $> 5$  meant that the patient had a sleep disturbance. Sleep quality was measured twice, before intervention (pre-test) and after intervention (post-test). In the experimental group music therapy was provided using MP3 devices and earphones. Children are asked to listen to music with duration of 30-45 minutes before going to bed at night. Music therapy is given for four days with the period of providing the same music therapy. Sleep quality re-measured on the 5<sup>th</sup> day after the provision of music therapy (posttest) while in the control group no music therapy was given and the posttest was done on the 5<sup>th</sup> day. In this research for statistical analysis of

data, dependent t-test and independent t-test measures were used. Values of  $p < 0.05$  were considered significant. Data were analyzed using IBM SPSS 22 for Windows Version. The study was explained to the patients, and permissions from participants were sought by informed consent, while confidentiality and anonymity were assured. Participants had the right to withdraw from the study at any time.

#### 4. Results

Table 1 presents the characteristics of the two groups. Most of the participants were female who has cancer (56,7%). The average age of the experimental group was 13,07 (SD=2,60), and the average age of the control group was 11,80 (SD=2,37).

Table 1. Participants' Characteristic (n=30)

Variable	Experimental Group (n=15)	Control Group (n=15)	Total (n=30)
	Mean (SD)/ n (%)	Mean (SD)/ n (%)	n (%)
<b>Age</b>	13,07 (2,60)	11,80 (2,37)	
<b>Sex</b>			
Male	7 (46,7%)	6 (40%)	13 (43,3%)
Female	8 (53,3%)	9 (60%)	17 (56,7%)
<b>Diagnosis</b>			
Cancer	12 (80%)	11 (73,3%)	23 (76,7%)
Non Cancer	3 (20%)	4 (6,7%)	7 (23,3%)

Table 2. Mean different pre and post of sleep quality (n=30)

Variable	Experimental Group (n=15)			Control Group (n=15)		
	Average					
	Mean	SD	p-value	Mean	SD	p-value
Before	7,13	2,33		6,53	1,73	
After	5,60	2,20	<b>&lt;0,001</b>	6,27	1,67	<b>&lt;0,104</b>

Table 3. Average difference in sleep quality score (n=30)

Variable	Group	Average	SD	P value
<b>Score</b>	Control Group	-0,27	0,594	<b>0,001</b>
<b>difference</b>	Experimental	-1,53	1,13	
<b>Sleep quality</b>	Group			

Table 2 inferred that quality of sleep within the participants improve in a positive way. It could be concluded by the decrease trend quality of sleep score within the two groups, which was the average score of a quality score within the control group was 6.27 and in the intervention group was 5.60. The difference in score of quality of sleep within the control group did not show any significant difference with p-value 0.104. Whereas, quality of sleep score in the intervention score reflected a significant difference with the p-value  $< 0.001$ .

Table 3 reflected difference analysis score quality within two groups. It was found there was significance group within the group given music therapy compared with the group not given of it ( $p=0,001$ ;  $p<0,005$ )

## 5. Discussion

The average age of the experimental group was 13,07, and the average age of the control group was 11,80. Respondents' age entered into the range of school age (6-12 years) and adolescents (12-18 years) (2). Total sleep needs are most significant during infancy and decrease across childhood. School-age children require 9-10 of sleep per 24 hours and awaken briefly 4-6 times each night after each sleep cycle (17) At the age of adolescents will experience shifting circadian rhythms, so even hours sleep shift. Most of the participants were female (56,7%). Sleep in children can be influenced by sex (18,19), but the previous study states that the duration and sleep schedule of children is not changed by the sex of the child (20).

Majority of the respondent in this study that affected by sleep disturbance was a cancer patient, which was 76.7%. Cancer patient tends to experience sleep disorders higher than the average population. The previous study found that 40% of children and a teenager with cancer report of sleep disturbance during chemotherapy (3). Children and adolescents are receiving chemotherapy report that sleep disturbances across treatment modalities (3, 21). For children with cancer, the nature of their disease, its treatment-related effects may compromise sleep quantity and quality both during treatment and following completion of therapy (3, 21, 22). To reduce the risk, oncology nurses need to be familiar with useful evidence-based that are effective in assessing and improving the quality of patient sleep (23).

By giving music therapy in children with chronic care affected by sleep disorders found that statistically, quality of sleep become better within the group given music therapy. It was proven by the decreasing trend of quality of sleep score ( $p < 0,001$ ). The result of this research is paralyzed with the other researchers concluded that intervention group showed a decrease in sleep score ( $P < 0,001$ ) after given intervention within four weeks (24). Separate study stated that group gave music therapy report significantly higher quantity and quality of sleep compared with the control group ( $t=3,181$ ,  $p=0,002$ ,  $t=5,269$ ,  $p<0,001$ ) (11). Another research inferred that music therapy given before sleep within one week could provide a positive influence to the control group (10). In the other hand, control group quality sleep was degrading during hospitalization. It can be explained by the psychophysiology that stated that quality of sleep could improve by the body relaxation through music that could reduce noradrenalin (25, 26).

Based on the average difference of decreasing score of sleep quality (PSQI) within the two groups, the trend of it was declining of PSQI score. Its score was higher within the intervention that affected by music therapy. This research finding similar with the study that stated there was significant difference in the change quality of sleep within the group given music therapy and control group (10). Based on the other study shown that participant with low quality of sleep, got benefit from the calming traditional music therapy (27). Musical intervention aims to use music as a pleasant stimulus to block anxiety, fear, and tension and avoid patient from unpleasant thoughts (28). Listening music for forty-five minutes could encourage relaxation of an individual during the sleeping period (9, 25, 29).

Because of that, it could be an effective therapy for people with a sleep disorder to improve their quality of sleep (PSQI > 5).

## 6. Conclusion

It can be concluded that there was an increase in quality sleep among children with chronic illness. It can be inferred by the decreasing trend of PSQI score pre and post after music therapy. To sum up, music therapy could be used as an alternative therapy to improve quality of sleep to improve children with chronic illness quality of life.

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